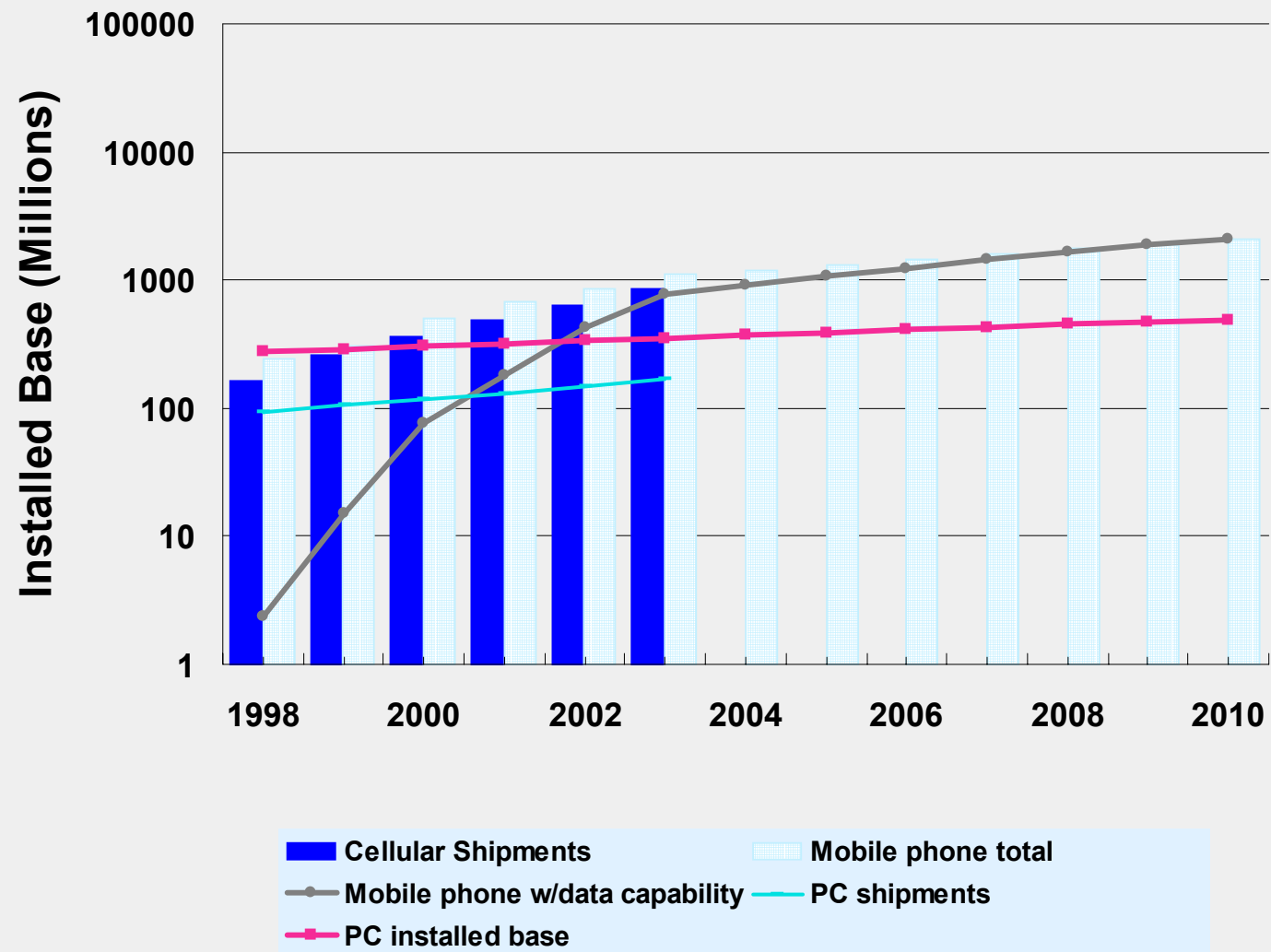

Pervasive Computing

Ambuj Goyal (ambuj@us.ibm.com)

Wherever
Whenever,
However..



Pervasive Devices Will Be the Dominant Means of Information Access



Sources: ResearchPortal.com, Semico, EE Times, Reuters, Gartner, Ericson...

Becoming Ubiquitous



Time

Becoming Ubiquitous



Miniaturization

(from "Miniaturization," H.D. Gilbert, Ed., Reinhold Publishing Corp., New York, 1961, p. 114)

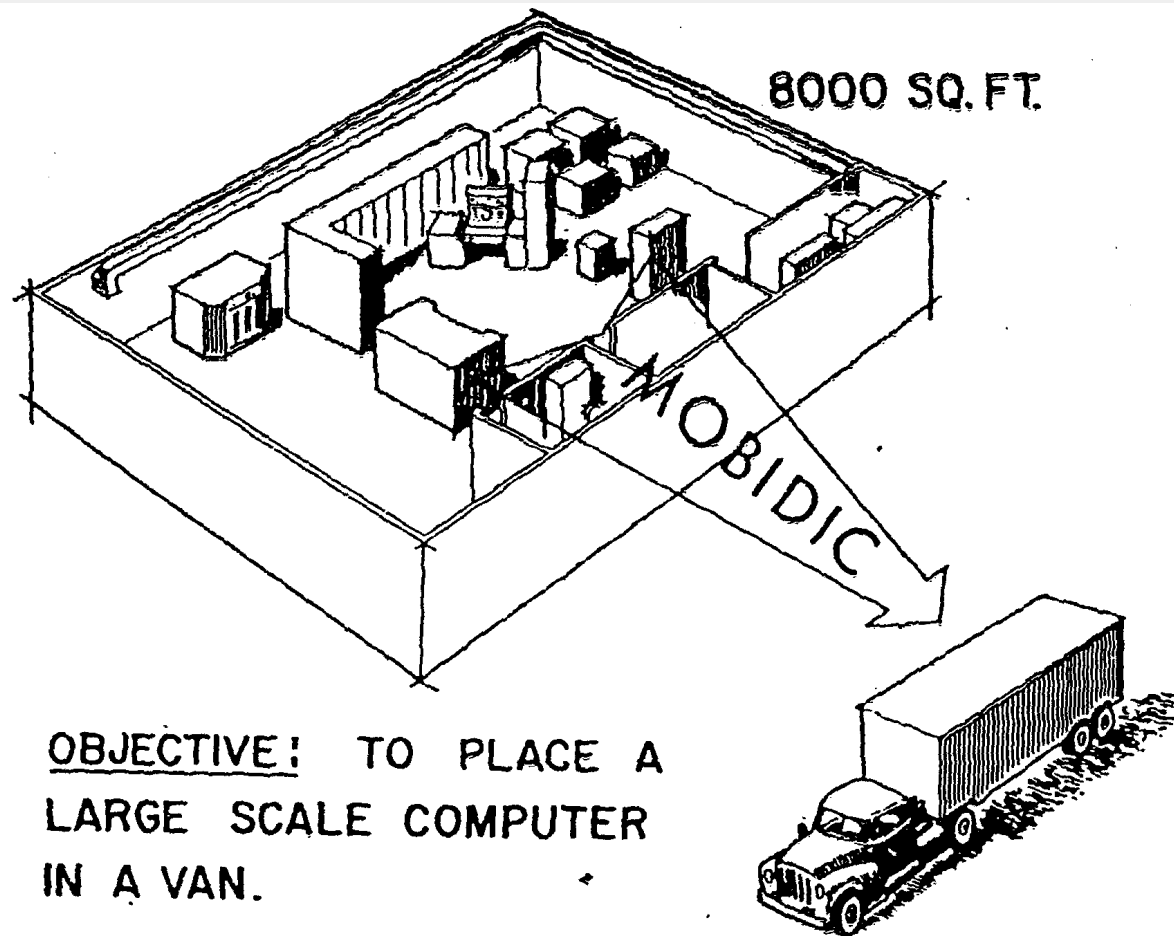
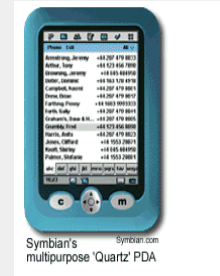
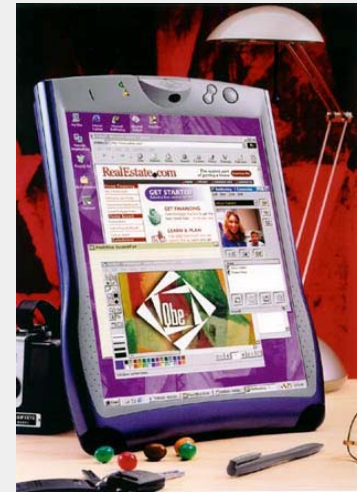


Figure 7.1. Full-scale digital computer in military trailer. (Courtesy Sylvania Electric Products, Inc.)

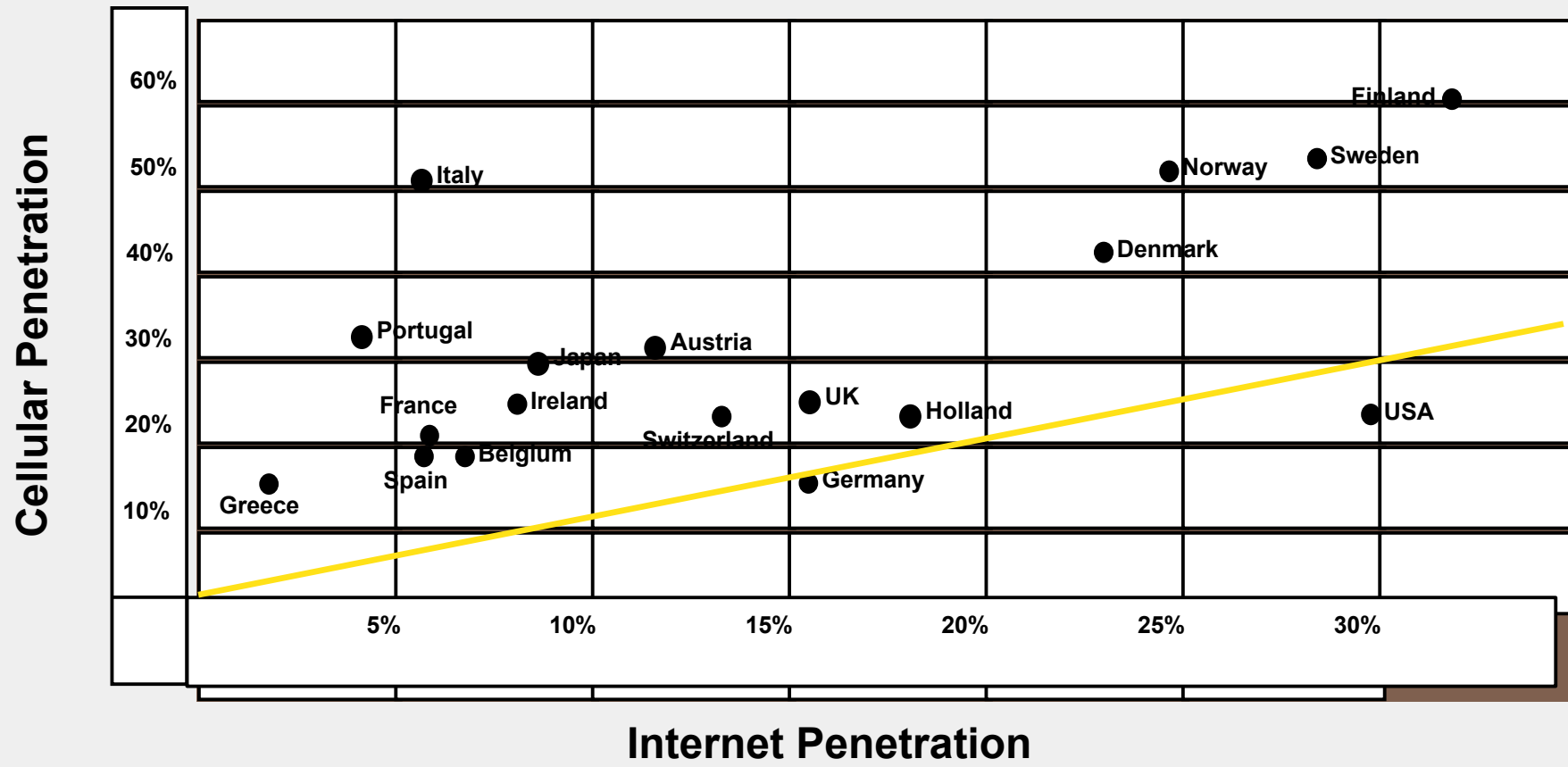
Many Device Types



Pervasive Explosion

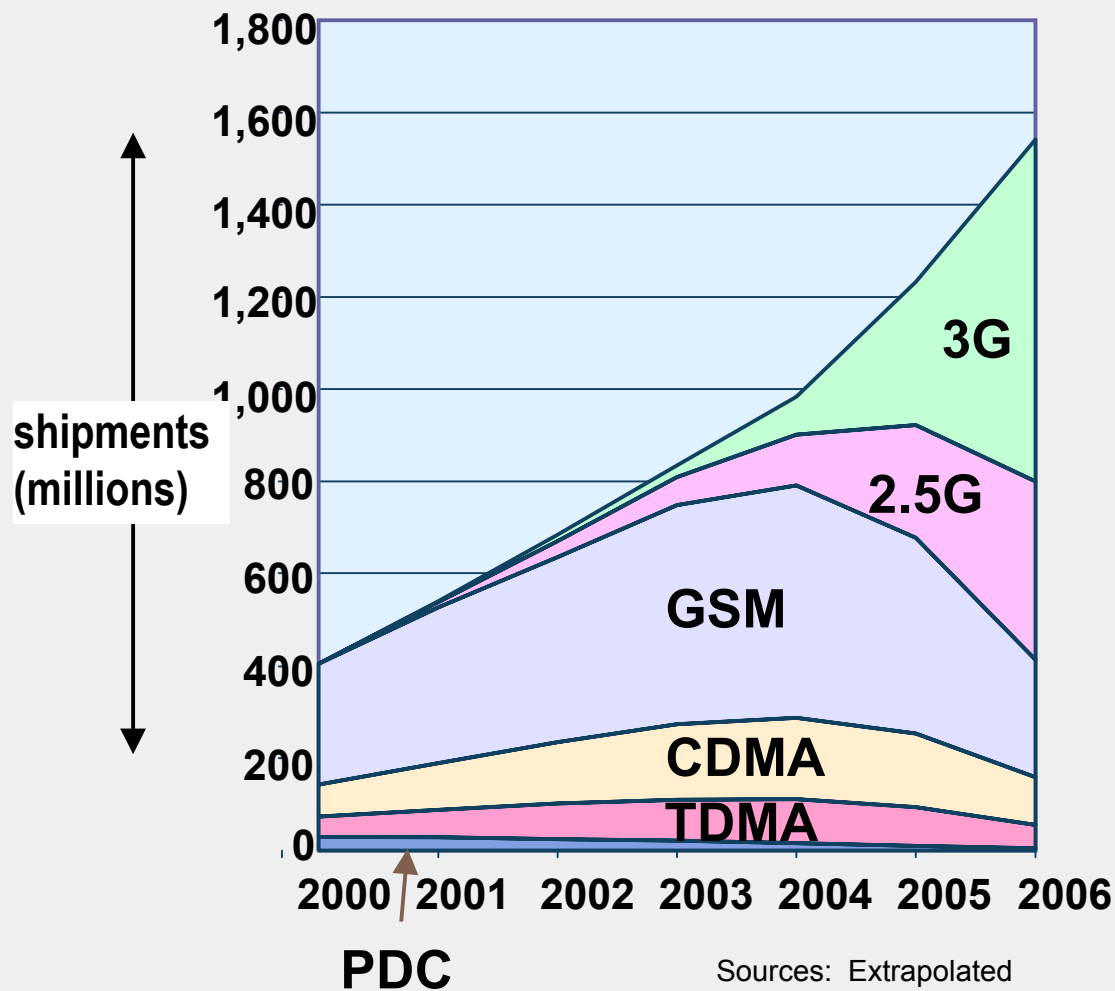


A Global View of the Marketplace

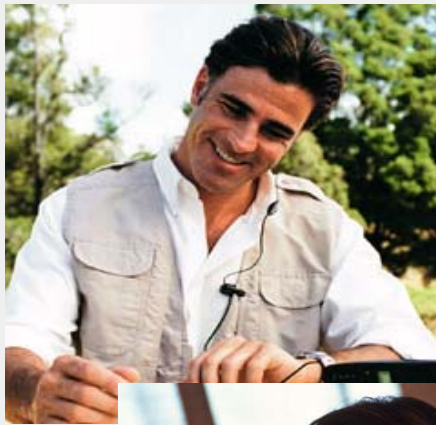


Evolution of Cellular Technology

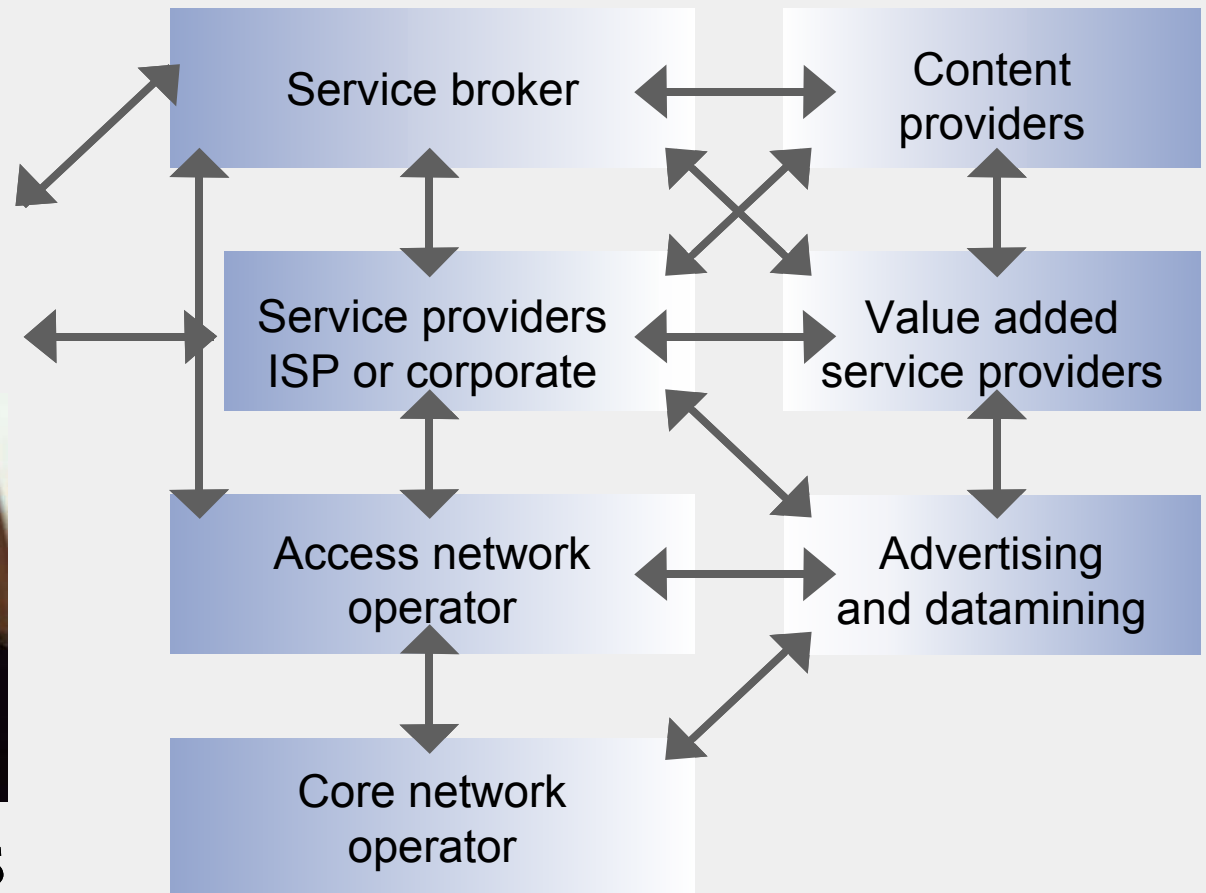
Digital Wireless Handsets by Protocol



Business Models Are More Complex



Consumers



What Service Providers Are Asking:



How will I make money in this new paradigm?



How do I retain the most profitable customers?



What technology should I buy and whom should I partner with?

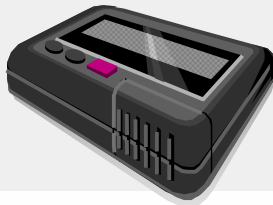


How do I balance time to market with the need for a solid, flexible infrastructure?

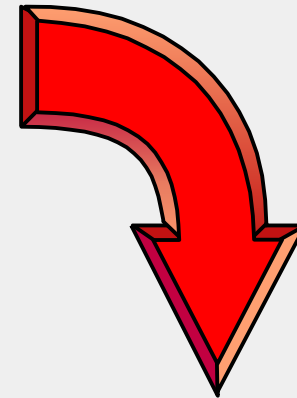
Scenario 1: Enabling Reach (CRM)



- Auction/Market alert
- Event alert
- Market efficiency



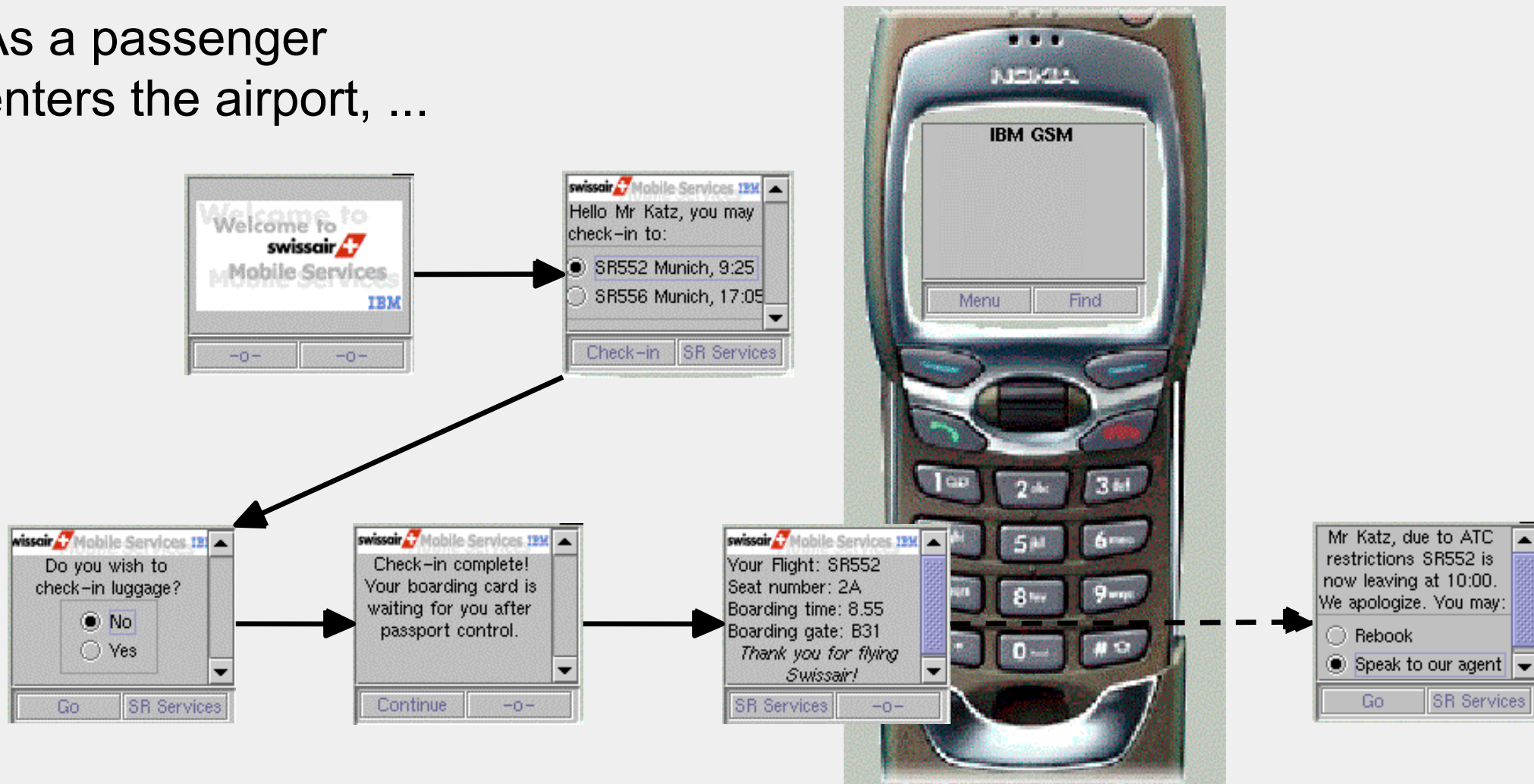
806.62	38.97 A
849.71	33.35 A
807.90	2.93 A
841.54	96.03 A
807.10	13.29 A
826.42	4.70 A
	8.89 W



Market Alert
Price: IBM at 125.3
Time: 2:02 EST
Buy?

Swissair Easy Checkin Process

As a passenger enters the airport, ...

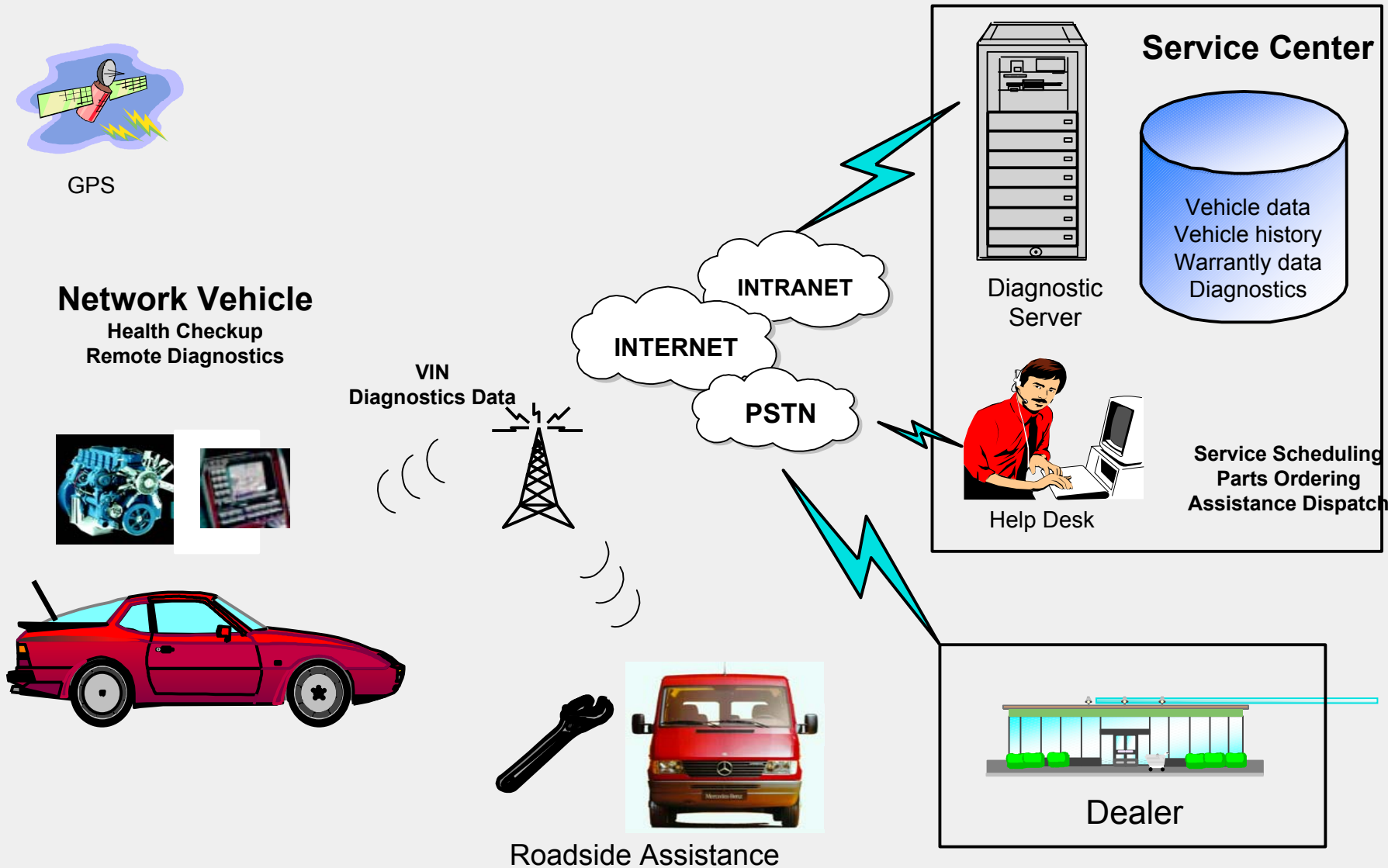


Scenario 2: Location-aware Applications

- Positioning infrastructure
- Step by step directions
- electronic payment

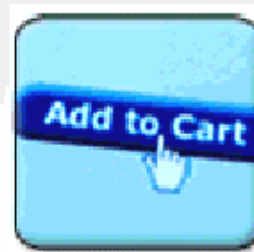
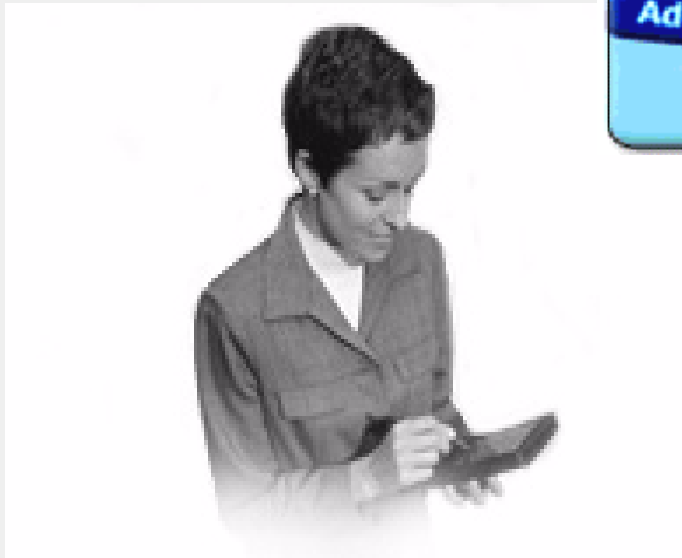


Automotive Solutions



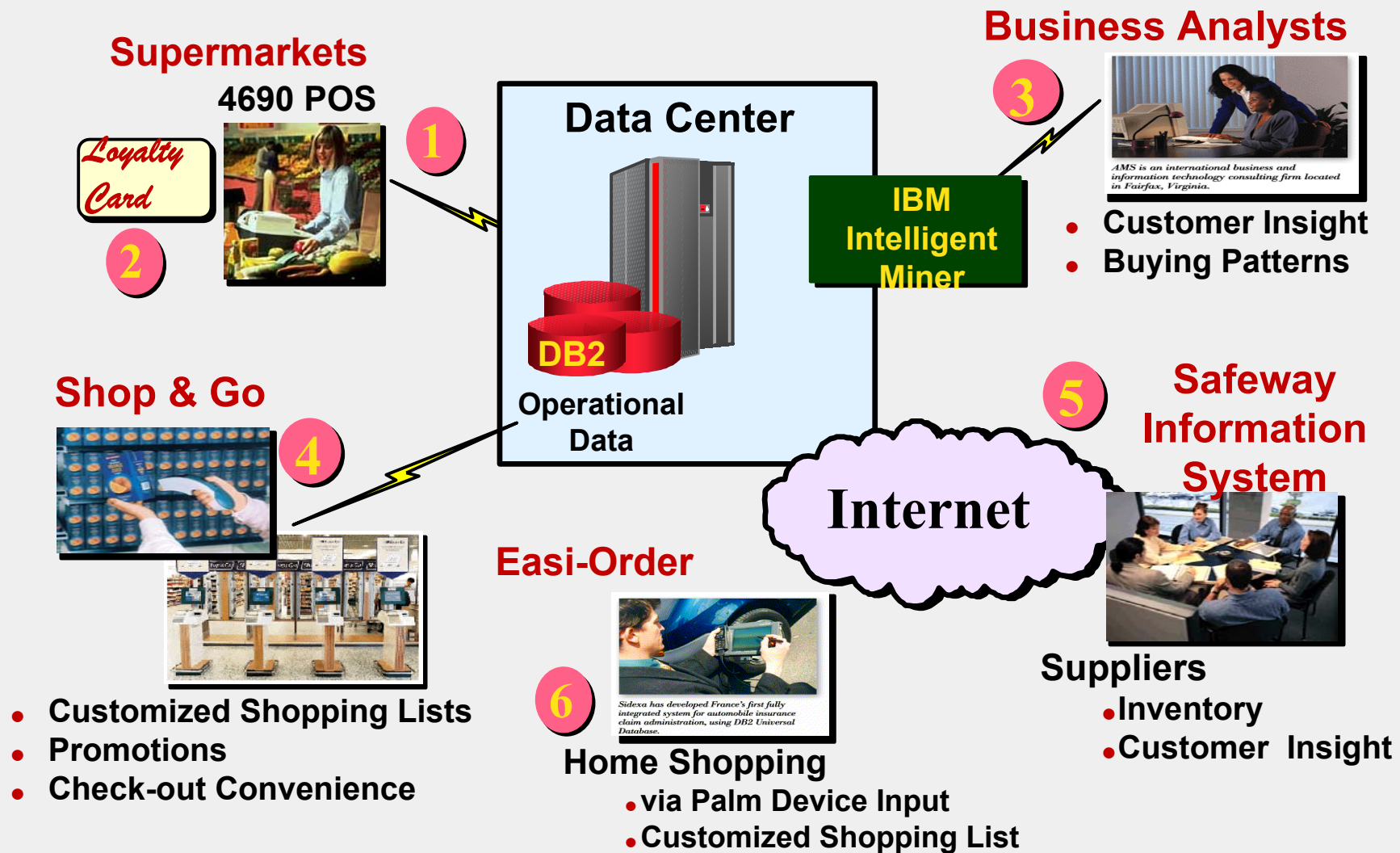
Scenario 3: Business Optimizaton

- Efficiency of Information
 - Informed consumer
- Targeted marketing
- Value of convenience



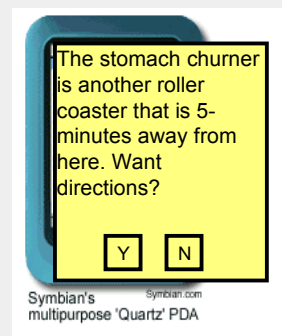
Safeway, UK (plc)

Building e-business end to end



Scenario 4: Embedded

- Efficient utilization of assets
- Improved customer satisfaction
- Targeted marketing
- Notification, Location, Information efficiency



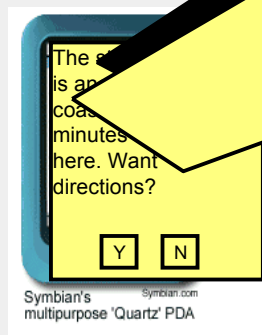
Scenario 4: Embedded

- Efficient utilization
- Improved customer
- Targeted marketing
- Notification, Location efficiency

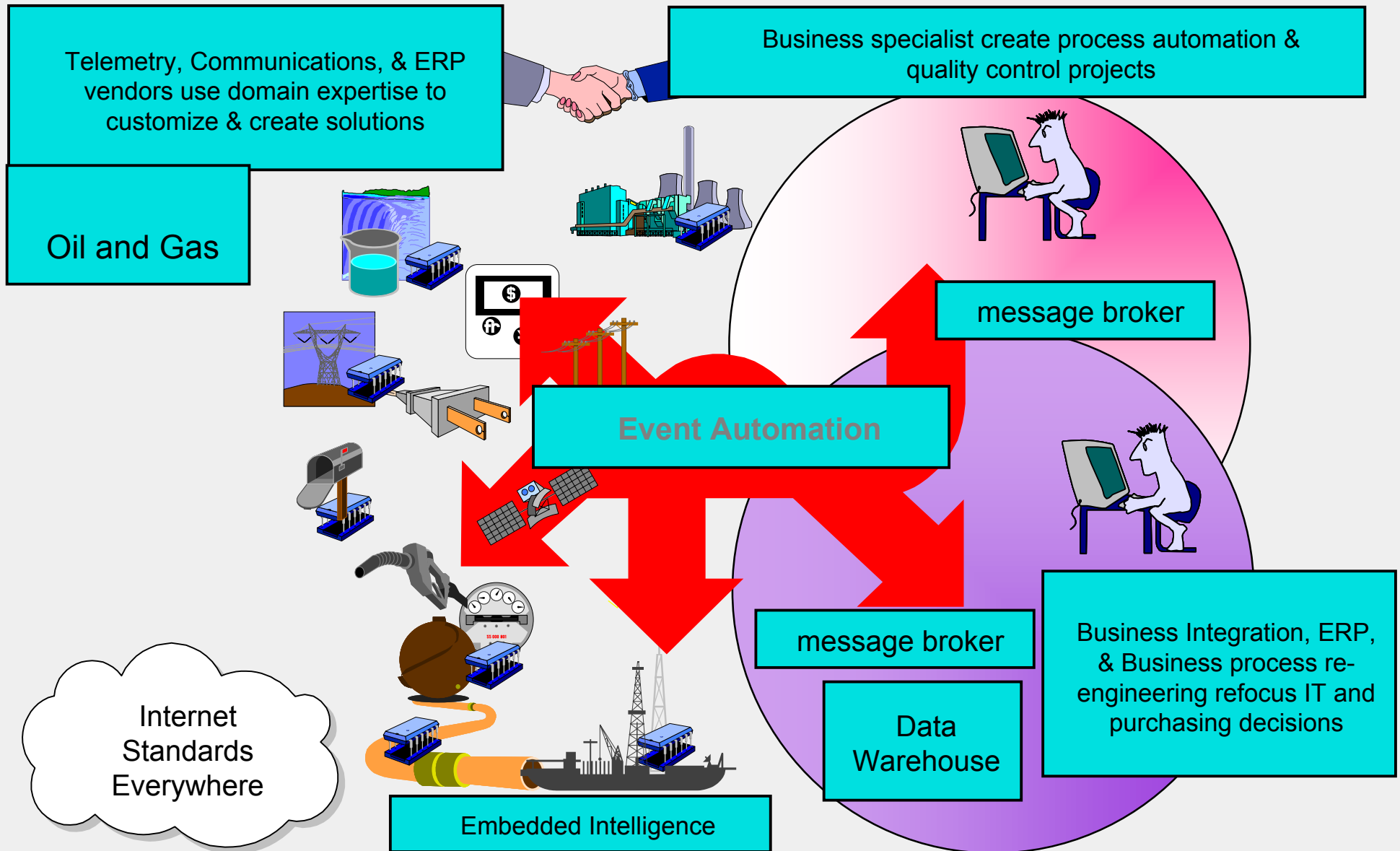
The stomach churner is another roller coaster that is 5-minutes away from here with 10-minute waiting time. Want directions?

Y

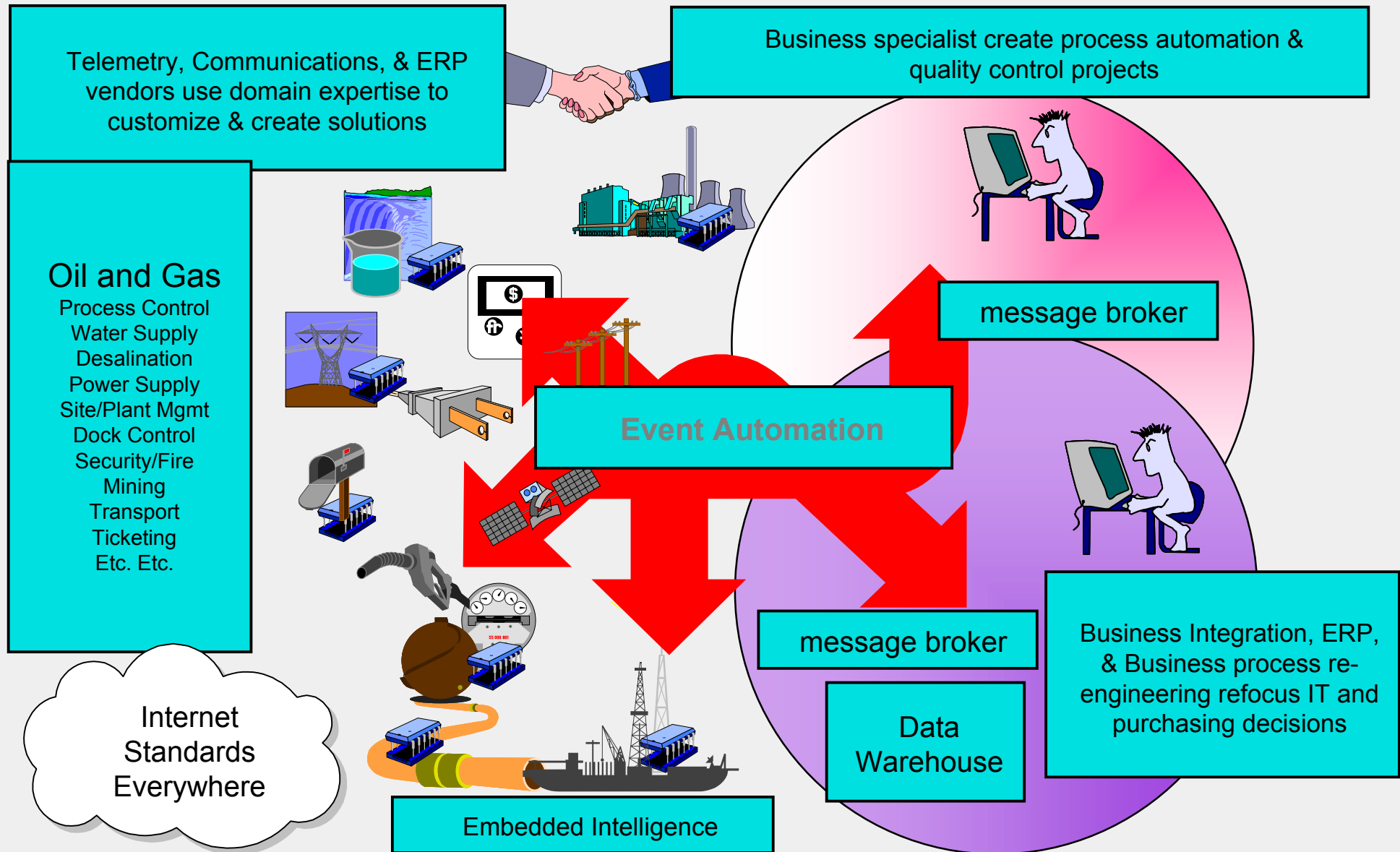
N



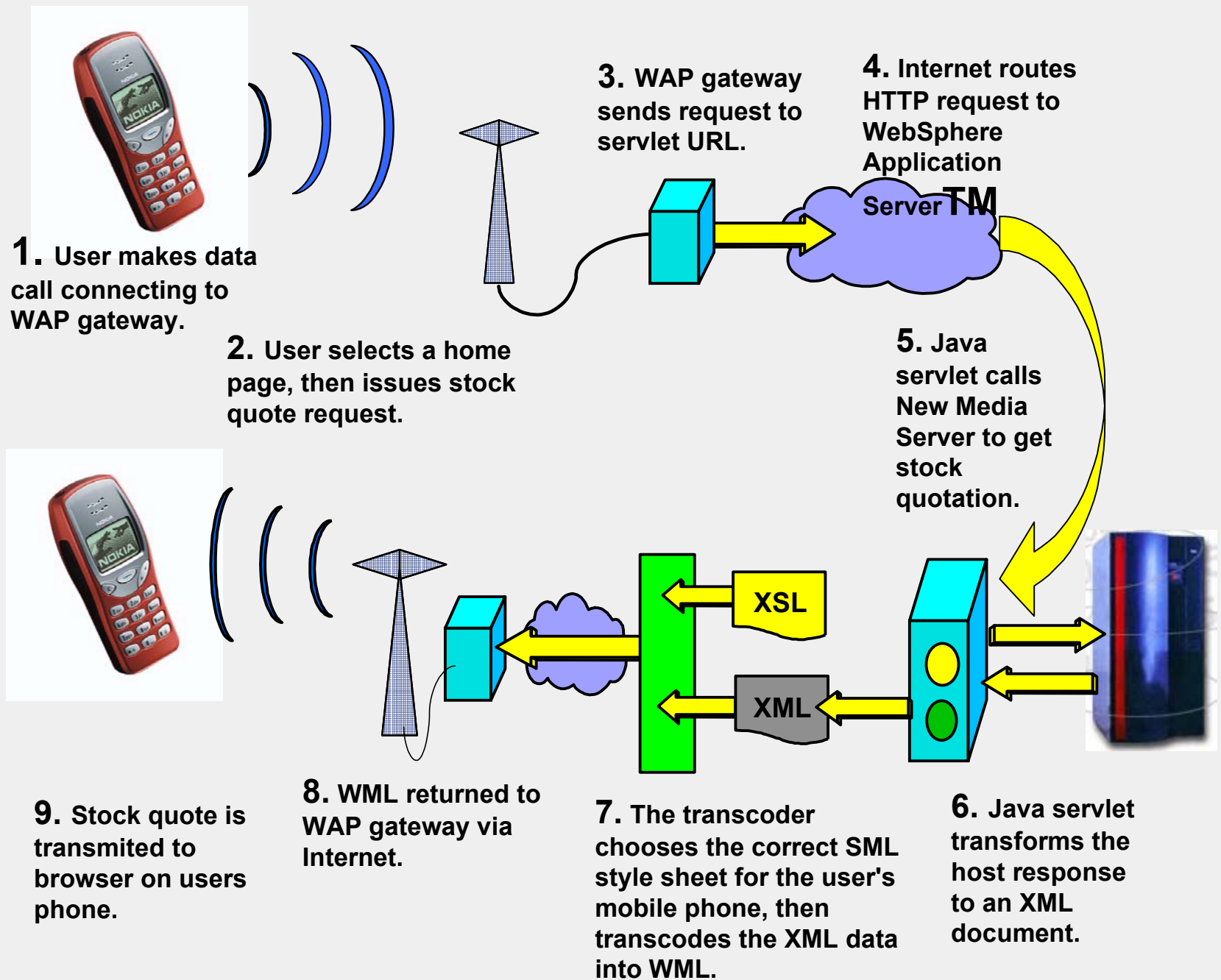
Embedded Sensors in Oil/Gas



Embedded Sensors in Oil/Gas



Standards: getting a stock quote...



Security: The Payment "Experience"

The challenge:

How to "simplify" the buying process

- Electronic credit card
- e-cash
- Smart cards
- Biometrics



Security: Biometrics



Speech



Fingerprint



Handwriting



Face



Eye

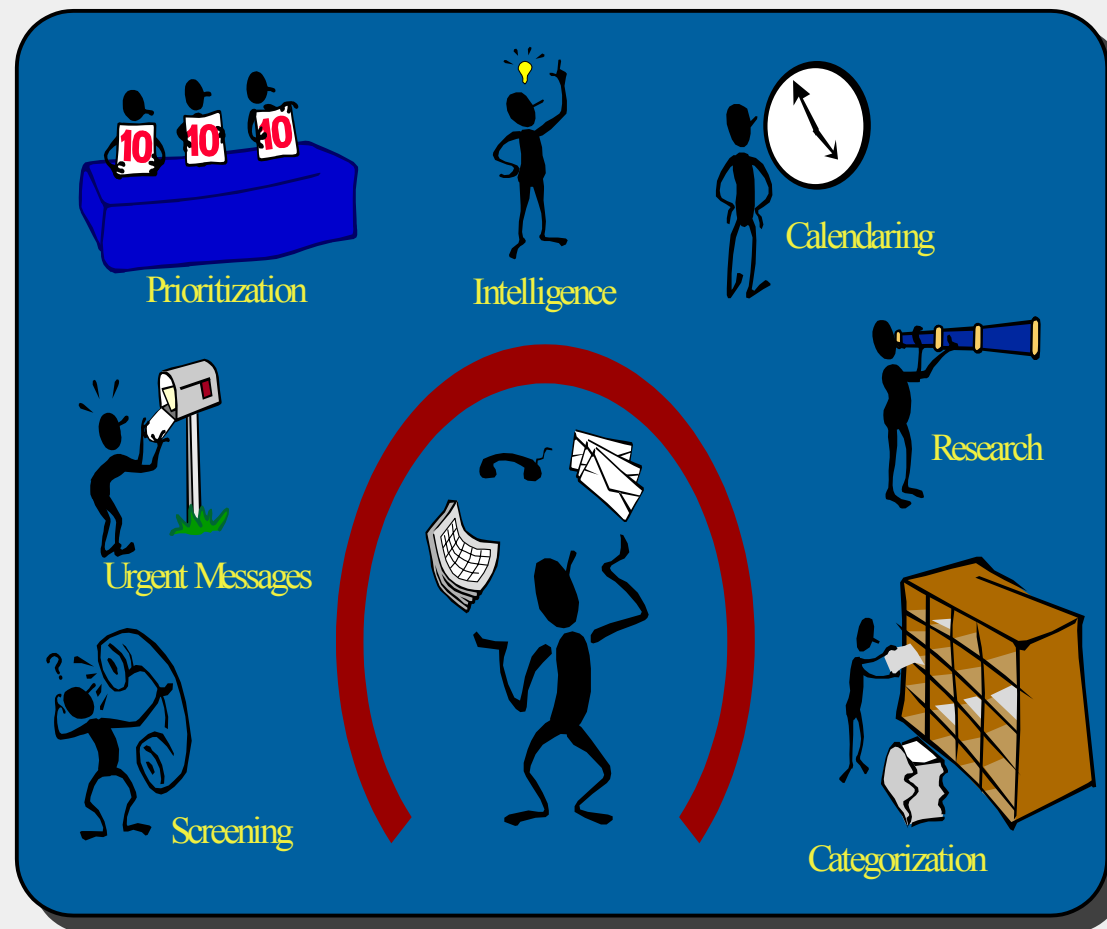


Hand Geometry

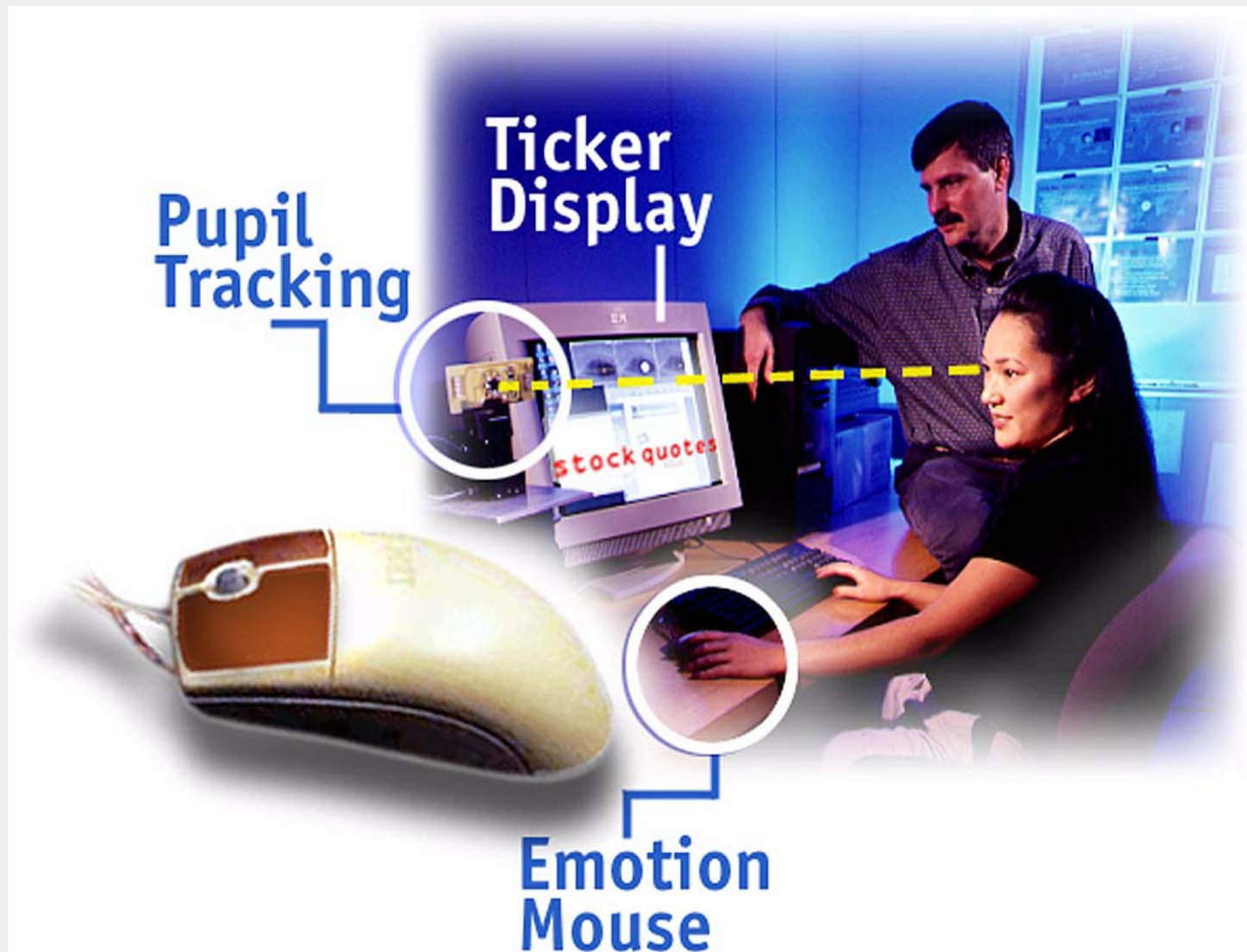
Collaboration: Quickplace



Virtual Assistant



Attentive Environments



Technology: WatchPad

Billions **Of watches**
Wearable

➔ always on you

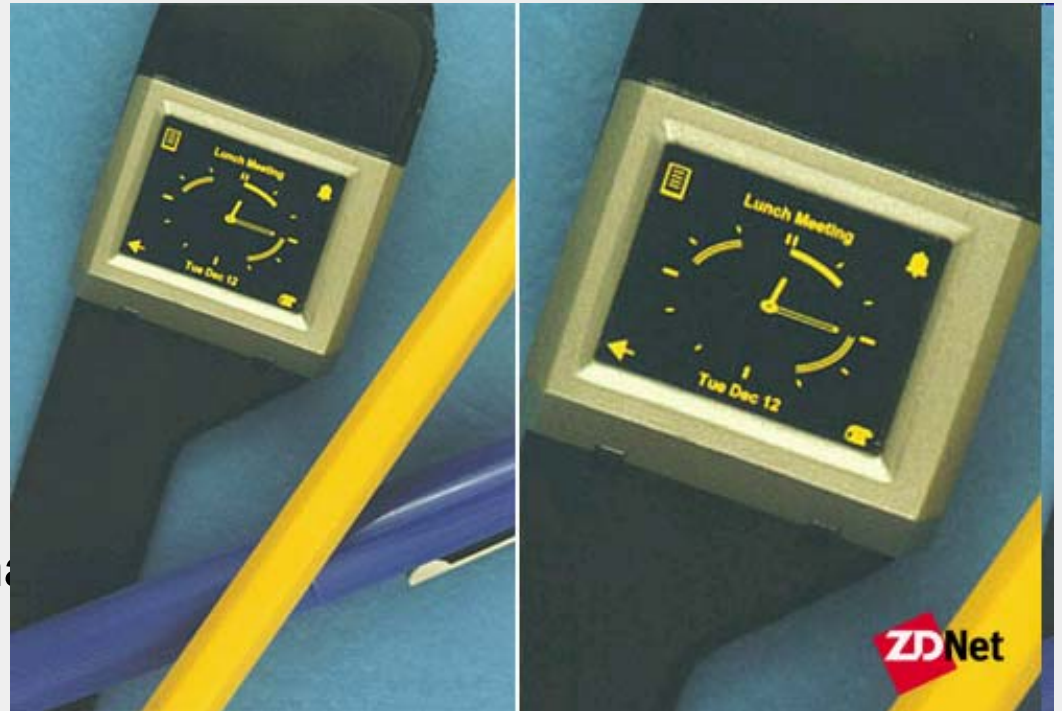
Easy access

Touch controls

Wireless companion

Access

- ➔ Schedule
- ➔ Directions
- ➔ Personal Information



Multimodal

